

METHOD FOR WATER TREATMENT UTILIZING A LIQUID
VACUUM CYCLONE INTERFACE APPARATUS

RELATED APPLICATION

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This application is a continuation-in-part of United States Patent
Application Serial No. 10/180,216, filed June 25, 2002, which claims priority
from United States Provisional Application Serial No. 60/300,768, filed June 25,
2001.

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BACKGROUND OF THE INVENTION

The present invention generally relates to the treatment of
contaminated liquid such as water. More particularly, the present invention
relates to a method of manipulation, removal or addition, and reorganization of
dissolved gas volumes in a liquid, and the opportunity to efficiently irradiate the
liquid, and in some instances, irradiate low pressure gas additions with photon
energy through a generally evacuated low loss pathway.

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In the treatment of water, it is often desirable to remove an unwanted
dissolved gas, while in other treatment streams, it may be desirable to dissolve
a specific gas into a solution. In addition, it is often desired to irradiate a stream
of liquid with UV or other photon energies, for disinfection, sterilization,
photochemical reaction and the like.

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The conventional methods of gas entrainment and gas stripping in a
liquid stream suffer a variety of limitations. For instance sparging of gas into a
liquid is a method commonly used in low-pressure systems. The inefficiency of
sparging is well known. Sparging produces gas bubbles whose excessive size
causes rapid flotation out of the water, and even in systems with mechanical
mixing means, most sparge gas never entrains into the liquid. Another
30 entrainment method, pressure entrainment, has relatively slow entrainment time